

REMARKS

The Applicants thank the Examiner for the timely indication of allowable subject matter as to claims 36, 37, 39-42, 48, 49, and 51-55. The remaining claims stand rejected. Reconsideration of the present application in view of the following comments is respectfully requested.

Claims 34, 35, 43, 45, 46, 47, and 55 were rejected under 35 U.S.C. §102(e) as being anticipated by U. S. Patent No. 5,715,319 to Chu (the Chu reference). The Applicants respectfully traverse. As an initial matter, it is noted that dependent claim 55 is rejected on p. 2 of the Office Action, but is also indicated to contain allowable subject matter in the Office Action Summary and on page 4 of the Office Action. Out of an abundance of caution, the Applicants have treated this claim as though it were rejected; however, clarification on this point is respectfully requested. It is noted that the Chu reference is of a type subject to removal under the procedure afforded by 37 C.F.R. §1.131. However, assuming arguendo that the Chu reference is properly asserted as prior art, it is believed that all claims remain patentable as explained in the following remarks.

"[A]n invention is anticipated if the same device, including all the claim limitations, is shown in a single prior art reference. Every element of the claimed invention must be literally present, arranged as in the claim." Richardson v. Suzuki Motor Co. Ltd., 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). As a result, a reference that coincidentally lists features of a claim without describing the claimed arrangement, relationship, or organization of such features cannot anticipate. The Fig. 6 embodiment of the Chu reference asserted in the Office Action purportedly describes a

“superdirective” steerable microphone array as explained in Col. 9, lines 21-63. The only apparent description of how directivity is determined is provided in connection with the related Fig. 5 embodiment to which the Office Action also cites (Col. 8, line 58 - Col. 9, line 20). In particular, the array direction is determined by finding the maximum peak energy in each of a number of frequency bands, tallying votes based on the frequency bands with maximum peaks above a given threshold, and selecting the direction which receives the greatest number of votes. In other words, the direction from which the greatest acoustic energy is detected becomes the direction to which the microphone array is computationally steered. It should be appreciated that this approach assumes the loudest sound is the one to which the microphone array should be directed. Such an approach is in keeping with the specific field of teleconferencing to which the Chu reference is directed (See, for example, Col. 1, lines 9-18 and Col. 10, lines 5-9).

In contrast, the features of independent claim 34 that are not disclosed, taught, or suggested by the Chu reference include “determining location of the second source [of an interfering acoustic signal] relative to the first source [of a desired acoustic signal] as a function of the first and second signals.” Claim 34, lines 6-7. The Chu reference makes no distinction regarding the relative location of an interfering acoustic signal (the second source) and a desired acoustic signal (the source). Instead, the steerable array of the Chu reference is merely steered in the direction of greatest intensity, which may not be a source at all because of reflection, constructive interference, and the like. Even if this direction of greatest intensity is deemed to provide a desired signal, the Chu reference still fails to determine location of a source of an interfering signal relative to such direction.

Among the ways in which the invention of claim 34 can be practiced, include designation of a reference axis that is positioned to indicate the source of the desired signal. The embodiments of Figs. 1-3 of the present application provide nonlimiting examples of this approach in which "sensors 22 and 24 are fixed relative to each other and configured to move in tandem to selectively position reference axis R1 relative to a desired acoustic signal source" (p. 9, lines 29-51 of the present application). In other embodiments of claim 34, a reference axis for desired source selection can be differently defined and/or provided in a form other than an axis. Alternatively or additionally, the desired source designator type and/or its orientation can be operator adjustable, just to name a few other examples.

In another aspect of the invention defined by claim 34, a characteristic signal representative of the desired acoustic signal is generated during performance of the location determination previously discussed (emphasis added). As explained in connection with the nonlimiting examples of the Fig. 1-3 embodiments of the present application, "it has been discovered that the spectral content of a desired signal from source 12, when approximately aligned with reference axis R1, can be estimated from $Xp^1(m)$. In other words, the spectral signal output by array 46 which most closely corresponds to the relative location of the "off-axis" source 14 contemporaneously provides a spectral representation of a signal emanating from source 12." Page 14, lines 24-28 of the present application. Thus, not only does the Chu reference lack the ability to determine relative location between interfering and desired sources, but also fails to provide a characteristic signal representative of the desired signal during this determination. Accordingly, it is respectfully submitted that independent claim 34 is not

anticipated by the Chu reference.

Independent claim 46 also includes features not disclosed, taught, or suggested by the Chu reference. For example, claim 46 includes “localizing the second source [of an interfering acoustic signal] relative to the first source [of a desired acoustic signal] as a function of the first and second signals, said localizing including establishing a number of location signals each corresponding to a different location relative to the first source.”

Claim 46, lines 6-8. In contrast, the Chu reference merely tallies up signal strength votes without establishing location signals that each correspond to a different location relative to the first source (of the desired acoustic signal). Therefore, it is respectfully submitted that independent claim 46 is also not anticipated by the Chu reference.

As a point of further clarification, it is submitted that the electronic output from node 427, which sums microphones 422L and 422H, is not an “acoustic excitation” that is a composite of a desired acoustic signal from a first source and an interfering acoustic signal from a second source. Instead, acoustic excitation as used in claim 34, refers to a mechanical energy form.

Besides the patentability of the respective base claims, further reasons support patentability of dependent claims rejected as being anticipated by the Chu reference. For example, dependent claim 43 recites that the interfering acoustic signal has an intensity greater than the desired acoustic signal, among other things. Because the Chu device steers to the most intense signal direction -- even if it is interference -- it would fail to output a characteristic signal representative of the desired acoustic signal under the terms of claim 43. In another example, dependent claim 55 includes further patentable features for at least the reasons given in connection with claim 43. In a further example,

dependent claim 45 recites that the characteristic signal is selected from a number of location signals that each correspond to a different location relative to the first source, and that the characteristic signal representative of the desired acoustic signal is also representative of the location of the second source [of the interfering acoustic signal] (emphasis added). Such features are also not disclosed by the Chu reference.

Accordingly, additional reasons support patentability of dependent claims rejected with the Chu reference.

Claims 44 and 56 were rejected under 35 U.S.C. §103(a) as being unpatentable over the Chu reference. The Applicants respectfully traverse. "To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure." Manual of Patent Examining Procedure (MPEP) §2142 (citing In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)). Moreover, the suggestion/motivation to combine or modify under §103 needs to be specific. Where a "statement is of a type that gives only general guidance and is not specific as to the particular form of the claimed invention and how to achieve it ... [s]uch a suggestion may make an approach 'obvious to try' but it does not make the invention obvious." Ex parte Obukowicz, 27 USPQ2d 1063, 1065 (U.S. Pat. and Trademark Off. Bd. of Pat.

App. & Interferences 1993) (citations omitted).

✓ Claim 44 recites that the separation of the second source is within five degrees of the first source relative to a zero degree azimuthal reference axis intersecting the first source at a midpoint situated between the first and second locations. Because the Chu device is not source-specific, but rather intensity-specific, one skilled in the art would not expect to be able to use Chu's teachings to distinguish sources within five degrees of one another as defined in claim 44. At least the same grounds support patentability of claim 56. See, In re Chu, 36 USPQ 2d 1089, 1095 (Fed. Cir. 1995) (reversing the Examiner's rejection with the indication that "obvious design choice" is precluded where the claim structure and the function it performs are different from the prior art). Thus, it is believed claims 44 and 56 remain patentable.

✓ Claims 38 and 50 were rejected under 35 U.S.C. §103(a) as being unpatentable over the Chu reference in view of U. S. Patent No. 5,793,875 to Lehr et al. (the Lehr reference). The Applicants respectfully traverse. As in the case of the Chu reference, the Applicants reserve the right to remove the Lehr reference under 37 C.F.R. §1.131. However, assuming arguendo the Lehr reference is properly asserted, it is believed that the claims remain patentable for at least the following reasons.

✓ The Chu reference is directed to a microphone array that is electronically steered among participants in a teleconference without physically moving it. In contrast, the hearing aid application of the Lehr reference relates to a fixed directional array that is moved to align with a selected sound source. Providing a hearing aid of the Lehr reference that changes direction depending on the direction of the loudest sound as taught in the Chu reference would be distracting to the user to say the least. Thus one skilled in

the art would not be motivated to combine these references in the manner asserted in the Office Action.

In view of the foregoing comments, it is respectfully submitted that claims 34-56 are in condition for allowance. Reconsideration of the present application is respectfully requested. The Examiner is encouraged to contact the undersigned by telephone to resolve any outstanding matters concerning the present application.

Respectfully submitted:

A handwritten signature in black ink, appearing to read 'L. Scott Paynter', written over a horizontal line.

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